NORTH DAKOTA DEPARTMENT OF AGRICULTURE

NORTH DAKOTA ENDANGERED SPECIES PROTECTION PLAN FOR PESTICIDES

Submitted to:

United States Environmental Protection Agency

February 18, 2009

NORTH DAKOTA DEPARTMENT OF AGRICULTURE

NORTH DAKOTA ENDANGERED SPECIES PROTECTION PLAN FOR PESTICIDES

NDDA personnel responsible for program administration are:

Jessica Orr*
Environmental Scientist
Telephone: 701-328-2980
Email: jnorr@nd.gov

Jim Gray
Pesticide, Feed, and Fertilizer Team Leader
Telephone: 701-328-1505
Email: jgray@nd.gov

Ken Junkert
Manager, Plant Industries
Telephone: 701-328-4756
Email: kjunkert@nd.gov

*Primary contact for Endangered Species program

TABLE OF CONTENTS

LIST OF FIGURES

Figure Page

Acronyms

EPA ..... Environmental Protection Agency
ESA ..... Endangered Species Act of 1973
ESPP ..... EPA's Endangered Species Protection Plan
FRN ..... Federal Register Notice
FIFRA ..... Federal Insecticide Fungicide and Rodenticide Act
GIS ..... Geographic Information System
NDASS ..... North Dakota Agriculture Statistics Service
NDDA ..... North Dakota Department of Agriculture
NDSU extension service ..... North Dakota State University Extension Service
NMFS ..... National Marine Fisheries Service
QAPP ..... Quality Assurance Project Plan
TNC ..... The Nature Conservancy
TP DMS ..... Least Tern and Piping Plover Data Management System
USFWS ..... United States Fish and Wildlife Service

INTRODUCTION

The North Dakota Department of Agriculture is committed to ensuring human safety and protecting the environment through the regulation of pesticide sales, distribution, storage and use. In addition, the department acknowledges the critical role that pesticides play in producing high quality food and controlling economically important pests.

Recently, concerns have been raised with how well government agencies regulating pesticides are protecting wildlife designated as threatened or endangered under the Endangered Species Act (ESA). In response to those concerns, the North Dakota Department of Agriculture (NDDA) is developing this plan to better protect threatened and endangered species from pesticides.

The NDDA's goal is to better protect the state's listed species while minimizing the economic impact to agriculture. To facilitate this goal, NDDA has developed a state initiated endangered species protection plan to better assess and mitigate the risk of pesticides to the listed species found in North Dakota. NDDA believes that by providing geographically specific data on pesticide use and fate in the environment, the United State Environmental Protection Agency (EPA) will have the best available data to make sound scientific decisions. Furthermore, access by EPA to the data will ensure that any measures to mitigate the risk of pesticide use to listed species will be both protective and reasonable.

The "North Dakota Endangered Species Protection Plan for Pesticides" has three main goals:

1. To supply EPA with state specific information to use in risk assessments,
2. To provide a platform for stakeholders to offer input and recommendations, and
3. To help plan and implement mitigation and management plans, including Endangered Species Protection Bulletin (Bulletins)

NDDA's goal is to develop a plan that is both protective of North Dakota listed species and reasonable for pesticide users.

BACKGROUND

Endangered Species in North Dakota

The United States Fish and Wildlife Service (USFWS) has listed seven species in North Dakota as threatened or endangered (hereafter called "listed") under the federal Endangered Species Act (ESA) of 1973 (Table 1). The species include three birds-piping plover (*Charadrius melodus*), least tern (*Sterna antillarum*) and whooping crane

(*Grus americana*); two mammals-black-footed ferret (*Mustela nigripes*) and gray wolf (*Canis lupus*); one fish- pallid sturgeon (*Scaphirhynchus albus*); and one plant-western prairie-fringed orchid (*Plantanthera praeclara*).

Table 1. Threatened and Endangered Species of North Dakota

Species name	Common Name	Description	Status
Charadrius melodus	piping plover	Bird	Threatened
Sterna antillarum	least tern	Bird	Endangered
Grus americana	whooping crane	Bird	Endangered
Mustela nigripes	black-footed ferret	Mammal	Endangered
Canis lupus	gray wolf	Mammal	Threatened
Scaphirhynchus albus	pallid sturgeon	Fish	Endangered
Plantanthera praeclara	western prairie fringed orchid	Plant	Threatened

The importance of North Dakota habitat varies widely amongst the seven listed species (Figure 1). Some of the species are found only in localized regions of the state, while others reside in North Dakota for only short periods of time each year.

Three of the seven listed species (black-footed ferrets, whooping cranes, and gray wolf) have limited distribution in North Dakota; therefore they have limited focus in the North Dakota Endangered Species Protection Program. However, EPA will use all seven species when performing risk assessments. Black-footed ferrets have historic range and potential habitat in the southwestern region of the state (Figure 2). However, black-footed ferrets have not had a documented occurrence in the state for more than thirty years. Whooping cranes have short stops statewide during migration in the spring (late April to mid-June) and fall (late September to mid-October), (Figure 3). During these migratory periods, whooping cranes reside in North Dakota for only a few weeks. Gray wolves are infrequent visitors to the state. Likely habitat for the gray wolf in North Dakota is the forested areas in north central and northeast North Dakota; however, they may appear anywhere. Gray wolves are only federally listed in the western third of North Dakota (Figure 4).

While black-footed ferrets, whooping cranes, and gray wolves are federally-listed species and important components of certain ecosystems, their lack of or limited distribution in the state will make it difficult or impossible to mitigate the risk of pesticides to them. In addition, our efforts would likely be better spent focusing on those species that are at higher risk of pesticide exposure in the state. Therefore, management efforts will be focused on listed species that are year-long residents and reproduce in the state.

Biology, distribution, and sensitivity of year-long resident listed species

Four listed species are year-long residents of North Dakota (piping plover, least tern, pallid sturgeon and western prairie-fringed orchid), and these four will be the focal

species in the North Dakota Endangered Species Protection Program. All but the western prairie fringed orchid occur on the Missouri River system.

Least tern

(Photo by: USFWS/S. Maslowski)

Least terns are the smallest members of the gull and tern family. They are approximately 9" in length, with a black head, gray on the wings, back and tail with a white underside. Their tails are forked, and their wings are narrow and pointed, making them very suitable for dramatic dives while foraging for small fish, their primary food source. The birds breed from May to August in North Dakota and then migrate to the Gulf of Mexico and Caribbean for the winter.

In North Dakota, least terns are found exclusively on the Missouri River system (Figure 5). They prefer sparsely vegetated sandbars, which have been reduced due to damming and channelization.

Piping plover

(Photo by: USFWS/Gene Nieminen)

Piping plovers are small shore birds measuring about 6 ½- 7" long. They are brown on their back, wings and top of their head with a white underside and distinctive black band across their chest and forehead. Piping plovers feed on open beaches on insects and small crustaceans. The breeding season for piping plovers is April through August. After breeding the population migrates to the Gulf of Mexico.

Piping plovers are found on the Missouri River system and on alkali lakes in the northwest and central region of the state (Figure 6). Plovers are threatened by a loss of sandbars and water fluctuations due to damming on the Missouri River system. Nest predator increases in recent decades threaten the plovers on both the Missouri River and alkali lakes.

Little is known about the least tern and piping plover's sensitivity to pesticides. Mierzykowski and Carr and Allen et al. did studies on a limited number of pesticides in piping plover and/or least tern eggs in Maine and Oklahoma respectively (1998, 2004). Both examined eggs shells for organochlorines and inorganic elements. Pesticides were not found or were well below ecological effects levels.

Pallid sturgeon

(Photo by: U.S. Fish & Wildlife Service)

Pallid sturgeon are prehistoric fish armored with rows of bony plates that run lengthwise from head to tail. They are a large, grayish white grayish white in color, and can weigh up to 80 pounds and live up to sixty years. Pallid sturgeon feed on insects, crustaceans and small fish. Pallid sturgeon do not reach sexual maturity until they are 7 to 12 years of age. There is little evidence of natural reproduction in the last fifty years, and it is believed that this lack of reproductive success is due to both a lack of spring river pulses that cue spawning and the existences of dams that cut off access to spawning grounds. Pallid sturgeon populations are currently augmented by artificial propagation.

Pallid sturgeon are found exclusively in the Missouri River system in North Dakota (Figure 7). They are adapted to large shallow rivers with gravel, sandbars and seasonal pulses, which is what the Missouri River was before widespread damming and stabilization efforts damaged pallid sturgeon habitat.

Little research has been done on the effects of pesticides on pallid sturgeon. Pallid sturgeon have a long egg maturation cycle, and Conte et al. suggested that this long cycle may make them susceptible to have pesticides concentrated in their eggs (1988). A study by Ruelle and Keenlyne in 1992 in North Dakota and Nebraska detected pesticides in tissue of pallid sturgeon, but the effects of these pesticide levels was unknown. The pesticides (chlordane, DDT, and dieldrin) found in the pallid sturgeon during the study are currently banned or cancelled. Research on white sturgeon shows that elevated pesticide levels in tissue is correlated with lower condition factors, gonadal abnormalities, and hermaphrodism (Feist et al. 2005).

Western prairie fringed orchid

(Photo by: U.S. Fish & Wildlife Service)

The western prairie-fringed orchid is a perennial plant with large white flowers that have fringes on the margins giving them a feathery appearance. The orchids grow up to three feet tall. The orchid flowers in June and July and is pollinated by hawk moths.

The preferred habitat of the western prairie-fringed orchid is moist, tall grass prairie. The orchid occurs in two counties in the southeast corner of the state in remnant high quality prairie (Figure 8). The conversion of prairie to cropland is the main reason for the orchid's decline. Herbicides may have negative effects on orchids, as may leafy spurge and other noxious weeds.

The issue of pesticides and western prairie-fringed orchids is complex because of the threat of leafy spurge invasion to orchid habitat. Herbicides may reduce leafy spurge but harm orchids; however, a study by Erickson (2006) showed that at least one type of herbicide is effective in controlling leafy spurge and does not harm orchids.

Agriculture in North Dakota

Agriculture is the most important sector of North Dakota's economy and number one industry. Production agriculture makes up to 25 percent of the state's economy, generating almost five billion dollars in cash receipts annually. One fourth of the jobs in the state are related to agriculture, and 89 percent of North Dakota land area is in farms and ranches.

Dynamic, diverse and constantly changing, agriculture is also important to our nation's economy and security. North Dakota leads the United States in the production of more than a dozen different commodities, including small grains, oilseeds and pulse crops.

North Dakota is divided into three main geographical and agricultural areas (Figure 9). Along North Dakota's eastern border is the Red River Valley. This valley was formed by sedimentation on the floor of Lake Agassiz which resulted in a flat, fertile, plain that is one of the world's richest agricultural production regions. A century ago, wheat was the leading crop of the Red River Valley. Today, wheat is still important, but much of this land is now sown with edible beans, soybeans, potatoes, sugar beets and corn.

In the midsection, the land is known as the prairie pothole or central coteau region. This area is covered by shallow wetlands formed by glaciers. Small grains like spring wheat, durum and barley dominate, but sunflowers and canola are also important. A newcomer to the central coteau region is corn. Once grown almost exclusively in the southeast corner of the state, corn is now raised almost everywhere, thanks to new drought-resistant varieties and to the demands of the state's rapidly growing biofuels industry.

The landscape and the agriculture change dramatically on the western side of the Missouri River. This region is drier and less fertile. In the high plains of southwest North Dakota, cattle are the predominant form of agriculture. North Dakota's livestock industry is largely centered on cow-calf production, but producers also enjoy an enviable reputation for the quality of their purebred cattle. Due to significantly lower levels of precipitation in the western third of North Dakota, many crops are grown in no-tillage or dry land production systems. Major crops in the west include wheat, flax, and safflower.

Pesticide Use in North Dakota

When used properly, pesticides play an important role in managing pests without posing a risk of unreasonable adverse effects to human health or the environment. According to

the last survey of ND pesticide users that occurred in 2004, pesticides are applied to more than 20 million acres each year out of the 40 million acres in farmland in the state (Zollinger et al. 2004). Herbicides were applied one or more times to 48.6 percent of agricultural land in ND in 2004, while fungicides and insecticides were applied to 5.4 percent and 2.4 percent of agricultural land, respectively.

Pesticides are most frequently applied with ground application equipment. However, use of aerial application equipment is becoming more popular. According to statistics from the ND Aeronautics Commission, approximately 4.8 million acres received an aerial pesticide application in 2007.

The specific type of pesticide used in a given area depends on a variety of factors, including the crop grown, identity of the pest, level of infestation, economic considerations, and other factors that are considered as part of integrated pest management. In addition, as described in the above section, agriculture in North Dakota is generally divided into three main regions across the state. Therefore, the specific pesticides used in a given area are closely linked to the types of crops grown in that area. For example, predominant pesticides used in the Red River Valley are those used on crops generally grown there, such as sugar beets, corn, soybeans, and potatoes. In contrast, pesticides used in the central coteau are generally those used most widely on cereal grains, sunflower and canola.

Federal Laws and Regulations

The North Dakota Plan for Threatened and Endangered Species must fit within federal regulations. For this reason, federal regulations pertinent to this plan are discussed below.

FIFRA

EPA has the authority to regulate the use and registration of pesticides through the Federal Insecticide Fungicide and Rodenticide Act (FIFRA). FIFRA requires that all pesticides be registered with EPA prior to their distribution and sale. FIFRA also prohibits the use of any registered pesticide in a manner that is inconsistent with the labeling. To register a pesticide, EPA must ensure that the pesticide does not pose an "unreasonable risk to man or the environment taking into account the economic, social and environmental costs and benefits of the use of any pesticide". This weighing of risks is is known as the FIFRA risk/benefit standard.

ESA

EPA must comply with the Endangered Species Act (ESA) when registering or renewing pesticides. The ESA's purpose is to protect and promote the recovery of animal and plant species that are threatened or in danger of becoming extinct and to ensure that the critical habitat they depend on is not destroyed or adversely modified. Section 7 of the ESA mandates all federal agencies to ensure that all actions authorized, funded or carried out by those agencies are not likely to jeopardize the continued existence of a federally listed

threatened or endangered species or their habitat. Through section 7, the EPA must ensure that their actions, including registration of pesticides, will not jeopardize listed species.

ESA implementation under FIFRA

To comply with FIFRA, EPA must weigh the risks and benefits of a pesticide. However, to comply with the ESA, EPA must ensure that its actions do not jeopardize listed species. To comply with both of these mandates, EPA has developed its Endangered Species Protection Program (ESPP).

The main component of EPA's ESPP is the use of geographic-specific pesticide use restrictions to better protect listed species from certain pesticide uses. A cornerstone of the program is the use of Endangered Species Protection Bulletins that will be published for specific parishes or counties where there is appreciable risk of pesticides to listed species. Partnered with appropriate pesticide label language, the Bulletins are regarded as pesticide labeling, and thereby enforceable use restrictions. Pesticide users are able to access the Bulletins online or by calling a toll-free telephone number. Because Bulletins are distributed online, it is relatively quick and easy for EPA to change the restrictions.

State Pesticide Authority

The North Dakota Department of Agriculture is the lead pesticide regulatory agency in the state. Under the authority provided by North Dakota Century Code (N.D.C.C.) in Chapter 19-18, no person may sell, offer for sale, distribute or transport any pesticide that has not been registered with the North Dakota Agriculture Commissioner. N.D.C.C. 19-18 allows the Commissioner to review pesticide labeling to ensure that it adequately mitigates risk to human health and the environment. Under N.D.C.C. 19-18, the Commissioner can request that a registrant report the amount of each registered pesticide sold, offered for sale, or distributed in the state.

The North Dakota Agriculture Commissioner is also responsible for enforcing N.D.C.C. 4-35. Together with the accompanying administrative rules found in Title 60 of the North Dakota Administrative Code, N.D.C.C. 4-35 regulates pesticide use, storage, certification, and record-keeping.

Therefore, through the authority granted to the Agriculture Commissioner under both N.D.C.C. 4-35 and 19-18, the Department has authority to regulate pesticides to ensure that only registered pesticides are sold, offered for sale, distributed, or used in the state. The Department has regulatory authority to ensure that pesticides are used according to product labeling, and that users and dealers comply with certification and record-keeping requirements.

State Roles

EPA recognizes that states are an integral part of the success of its Endangered Species Protection Plan (ESPP). Local, state and tribal situations may shape the effectiveness of different approaches to listed species protection. Therefore, EPA has given states and tribes the option to develop a state initiated plan. States and tribes may participate in the process at different levels of involvement. A state could choose to do nothing except their obligations as outlined in the Field Implementation Federal Register Notice (FRN), or they could develop a stand alone plan that would operate independently of EPA's registration process. In between these two options, states could supply EPA with relevant data and recommendations to aid the agency in better assessing the risk of pesticide uses to listed species, and develop effective risk mitigation measures. The state plans would initiate alternative strategies to protect listed species from pesticides for their state or tribe. The EPA could adopt the state plan as EPA policy in that jurisdiction.

If a state or tribe submits a state initiated plan to EPA, EPA will review the plan to see if the services will need to be consulted before EPA can approve the plan. After a thorough review, EPA will approve or disapprove the plan and notify the state or tribe of its actions.

How EPA conducts a risk assessment

To register a pesticide, EPA conducts a thorough review of the risk of that pesticide harming man or the environment. This review is done through one or several risk assessment models.

Risk assessment models allow scientists to predict the environmental fate of a pesticide in the environment without conducting extensive field studies. Data entered into the models typically includes the pesticide use rate per acre, number of applications per year, interval between applications and application methods. If data are not available, EPA is conservative and assumes the maximum value for the parameter to err on the side of the listed species.

PROPOSED NORTH DAKOTA ENDANGERED SPECIES PROTECTION PLAN FOR PESTICIDES

The North Dakota Department of Agriculture believes the best way to serve the interests of the citizens of North Dakota is to develop a state- initiated plan for endangered species protection. A state-initiated plan will help ensure that EPA has access to accurate and relevant pesticide use data, cropping information, and accurate information on the occurrence and distribution of listed species in the state. The Department also believes that a state-initiated plan will improve stakeholder buy-in and compliance by helping to ensure that any use restrictions are protective and reasonable. Input from the state could also include state-specific risk assessments based on local soil types, weather conditions, or pesticide use patterns. Access to accurate and timely data will help to ensure that we

develop a program that will be more protective of species than if there was limited state involvement.

The North Dakota Endangered Species Protection Plan for Pesticides proposes a process for the NDDA to provide specific state-level data and recommendations to EPA to consider in risk assessment processes. Data on local use would make EPA's risk assessments more accurate. This greater accuracy would afford species greater protection while not putting an unnecessary burden on pesticide users.

Components of North Dakota Endangered Species Protection Plan for Pesticides

EPA will be assessing the potential for pesticides to negatively impact listed species. There will be opportunties for state input throughout this process. First EPA will seek public comment on published ecological risk assessments during the pesticide registration, registration review, and re-registration processes. Second, EPA will develop Bulletins and propose use restrictions to better mitigate the risk of pesticides to listed species.

NDDA realizes that the quality of EPA's decisions on implementing measures to mitgate the risk of pesticides to listed species will be directly related to the quality of data that EPA has available. Therefore, NDDA requests the opportunity to supply EPA with data and recommendations on any pesticide uses or use restrictions that may impact North Dakota.

NDDA would provide EPA with specific data on pesticide use in North Dakota to be utilized in EPA's evaluations of pesticide risk to endangered species. In the next phase, NDDA would participate in the process of Bulletin development and mitigate pesticide restriction if necessary.

Phases of the plan

The North Dakota Plan for Endangered Species Protection has three phases

1. Submission of state data to EPA
2. Development of risk mitigation measures
3. Bulletin development and outreach

Phase 1

Under Phase 1 of the plan, NDDA would supply EPA with relevant data that EPA can utilize as the Agency assesses the risk of certain uses to listed species. These data include:

A. *Pesticide use data*. In conjunction with the ND Agriculture Statistics Service (NDASS), the NDSU Extenstion Service conducts a pesticide use survey of North Dakota agricultural pesticide users every four years. These data are critical as we assess what pesticides are used in the state,

where they are used, and in what manner. The surveys are currently published with state-wide pesticide use estimates, but it is likely that NDDA can refine existing statewide estimates to a county-by-county basis. The Department commits to supply EPA with the most accurate estimates available on pesticide use in North Dakota. With access to refined and accurate pesticide use information, EPA can better assess exposure of listed species to a given pesticide and whether additional use restrictions are needed to mitigate risk.

B. *Distribution & biology information on listed species*. If we are to assess the risk of pesticides to listed species in the most accurate manner, we need to know where each species is found in the state. We also need to know as much as possible about the biology of each species, including habitat, feeding habits, migratory patterns, and distribution. This information is critical as EPA conducts risk assessments. The Department commits to supply EPA with as much information as is available on the biology and distribution of the listed species in North Dakota.

C. *Information on the overlap between pesticide use and listed species*. Estimating exposure of listed species to given pesticides is a critical component of any risk assessment. Based on existing knowledge of listed species distribution, cropping information, and pesticide use, the Department can estimate whether a given pesticide use is likely to occur in the same locations and times where listed species are found. Under Phase 1, the Department will provide EPA with information on the potential overlap of pesticide uses and endangered species habitat.

D. *Cropping information*. North Dakota has very diverse agriculture. However, based on climatic and soil factors, certain crops are localized in different parts of the state. Using existing data from the ND Agriculture Statistics Service, the Department can supply EPA with county-by-county estimates of where certain crops are grown. This is important since most pesticides are only used on certain crops. Information on which crops are grown in different parts of the state and in different counties will aid the Agency as it conducts risk assessments.

E. *Environmental monitoring data*. The Department is working with partner state and federal agencies to conduct monitoring of surface water in North Dakota for pesticides. As we assess the potential for a given pesticide or pesticide class to move into surface water and other media, it is advantageous to know whether those pesticides or similar chemistries have been detected in the environment at signficant concentrations. This information will be critical as we identify those pesticide that have a potential to move off-site and negatively impact listed species. The Department commits to supply EPA with the best pesticide environmental monitoring data that is available.

F. *Soil type information.* There are also significant differences in the soil types across North Dakota. Soil type can have a dramatic effect on a pesticide's environmental fate, affecting such things as sorption, degradation, and leaching. The Department has access to digitized soil type information for the state and commits to make this information available to EPA.

In 2007 the ND legislature provided state-funded resources to the Department to create an Endangered Species Protection Program. These funds were used to create two new positions in the Department, both of which have been filled. One of the positions is a Geographic Information System (GIS) Specialist position, and this person has been compiling much of the data described here in a GIS database. These data can be supplied to EPA in a compiled and layered GIS database. However, the Department will supply EPA with relevant data in whatever format and manner that EPA requests it.

Phase 2

In addition to supplying the data described under Phase 1, NDDA can supply EPA with recommendations on potential pesticide use limitations to better protect endangered and threatened species. Specifically, NDDA will contribute recommendations on the technological, social and economic feasibility of implementing any proposed pesticide use limitations. Such input is essential since states understand the socioeconomic and political intricacies that exist within the state, as well as how to best change behaviors among its citizens.

The Department has many years of experience in regulating pesticide users and dealers in North Dakota. We have gained considerable insight not only on the culture and social environment within the state, but also in working with pesticide users to gain compliance with pesticide laws and regulations. Therefore, NDDA would also offer its recommendations on developing pesticide use restrictions that are enforceable and practical. Since NDDA is the lead pesticice regulatory agency in the state and will be the entity charged with enforcing any pesticide use restrictions developed through the ESPP, we feel that it is essential we have a role in developing the use restriction language.

In addition, NDDA has made a concerted effort to build a relationship of trust and mutual respect with the Bismarck field office of the U.S. Fish and Wildlife Service (USFWS). USFWS is also given an opportunity to offer input on FIFRA Section 18 exemption requests before they are submitted to EPA for review, as well as every FIFRA Section 24(c) registration before it is issued. We value this relationship with USFWS, and we would anticipate interacting with local USFWS staff as part of developing recommendations to EPA. This close working relationship between the NDDA and local USFWS staff will be invaluable as we strategize on how to best protect listed species in North Dakota from pesticides.

The Department hopes that there will be ample opportunities for state input as risk mitgation measures are developed, both on a formal and informal basis. We propose to offer recommendations on draft pesticide label language as well as proposed use restrictions to be included in Bulletins.

Phase 3

A cornerstone of EPA's ESPP will be the use of Bulletins that will add geographic-specific use restrictions beyond those on the product label whenever greater protection is needed. The Department fully supports the use of Bulletins as a means of providing greater protection of threatened and endangered species when such protection is needed. Such Bulletins will also allow pesticide regulators to accurately define those areas where use restrictions are required.

If Bulletins are necessary to better mitigate risk, NDDA offers its assistance in the development and review of those documents. Specifically, the Department will review the Bulletins for accuracy and to determine whether there are better means to identify those areas where the use restrictions are in effect. NDDA could also provide digitized maps to the Agency and express landmarks in terms commonly used in the state. The Department also offers its expertise and experience to assist EPA in developing the language used in the Bulletins.

Once Bulletins are published, NDDA will provide outreach and communication to pesticide dealers and applicators through a variety of means. NDDA already provides a link to EPA's ESPP website on the Department's website (http://www.agdepartment.com/). NDDA can conduct targeted outreach and meetings in specific areas of the state or among certain pesticide user groups to better communicate the need to comply with Bulletins, how to access them, and the rationale used to develop the risk mitigation measures. NDDA staff can discuss Bulletins at pesticide certification and training sessions, as well as during other education opportunities.

SUMMARY

The North Dakota Department of Agriculture values the partnership that it has with EPA as we regulate pesticides to mitigate risk to human health and the environment. We also recognize that pesticides are important management tools and an essential component of integrated pest management. We are confident and hopeful that state participation in EPA's ESPP will be extremely valuable. The Department strives to provide EPA with the most timely and accurate data available, thereby allowing the Agency to make good decisions that are based on sound science. Access to accurate, local data on pesticide use, listed species distribution, cropping information, and soil types will allow EPA to better estimate exposure and conduct risk assessments. Furthermore, offering NDDA the opportunity to offer recommendations on potential risk mitigation strategies will allow us

to develop pesticide use restrictions that are not only protective of listed species, but also reasonable. If the restrictions don't seem reasonable to the pesticide community, gaining buy-in and compliance may be very difficult.

REFERENCES

Allen G.T., S.H. Blackford, and D. Welsh. 1998. Arsenic, mercury, selenium, and organochlorines and Reproduction of Interior Least Terns in the Northern Great Plains. Colonial Waterbirds 21:356-366

Conte, F.S., S.I. Doroshoy, P.B. Lutes, and E.M. Strange. 1988. Hatchery manual for the white sturgeon with applications to the North American Acipenseridae. Publication 3322, University of California, Davis.

Erickson, A.M., R.G. Lym, and D. Kirby. 2006. Effect of herbicides for leafy spurge control on the western prairie fringed orchid. Rangeland and Ecology Management 59: 462-467.

Feist, G.W., M.A.H. Webb, D.T. Gundersen, E.P. Foster, C.B. Schreck, A.G. Maule, and M.S. Fitzpatrick. 2005. Evidence of detrimental effects of environmental contaminants on growth and reproductive physiology of white sturgeon in impounded areas of the Columbia River. Environmental Health Perspectives 113:12.

Mierzykowski S.E. and K.C. Carr. 2004. Environmental contaminants in piping plover, least tern and common tern eggs from coastal Maine - 2003 nesting season. USFWS. Spec. Proj.Rep. FY04-MEFO-1-EC. Old Town, ME.

Ruelle, R., and K.D. Keenlyne. 1992. Contaminants in Missouri River Sturgeon. U.S. Fish and Wildlife Service Report SD-FEW-93-01. Pierre, South Dakota.

Zollinger, R.K., P. Glogoza, M.P. McMullen, C.A. Bradley, A.G. Dexter, D. Knopf, E. Wilson, T. DeJong, and W. Meyer. 2004. Pesticide use and pest management practices in North Dakota. North Dakota State University Ext. Publication W-1308.

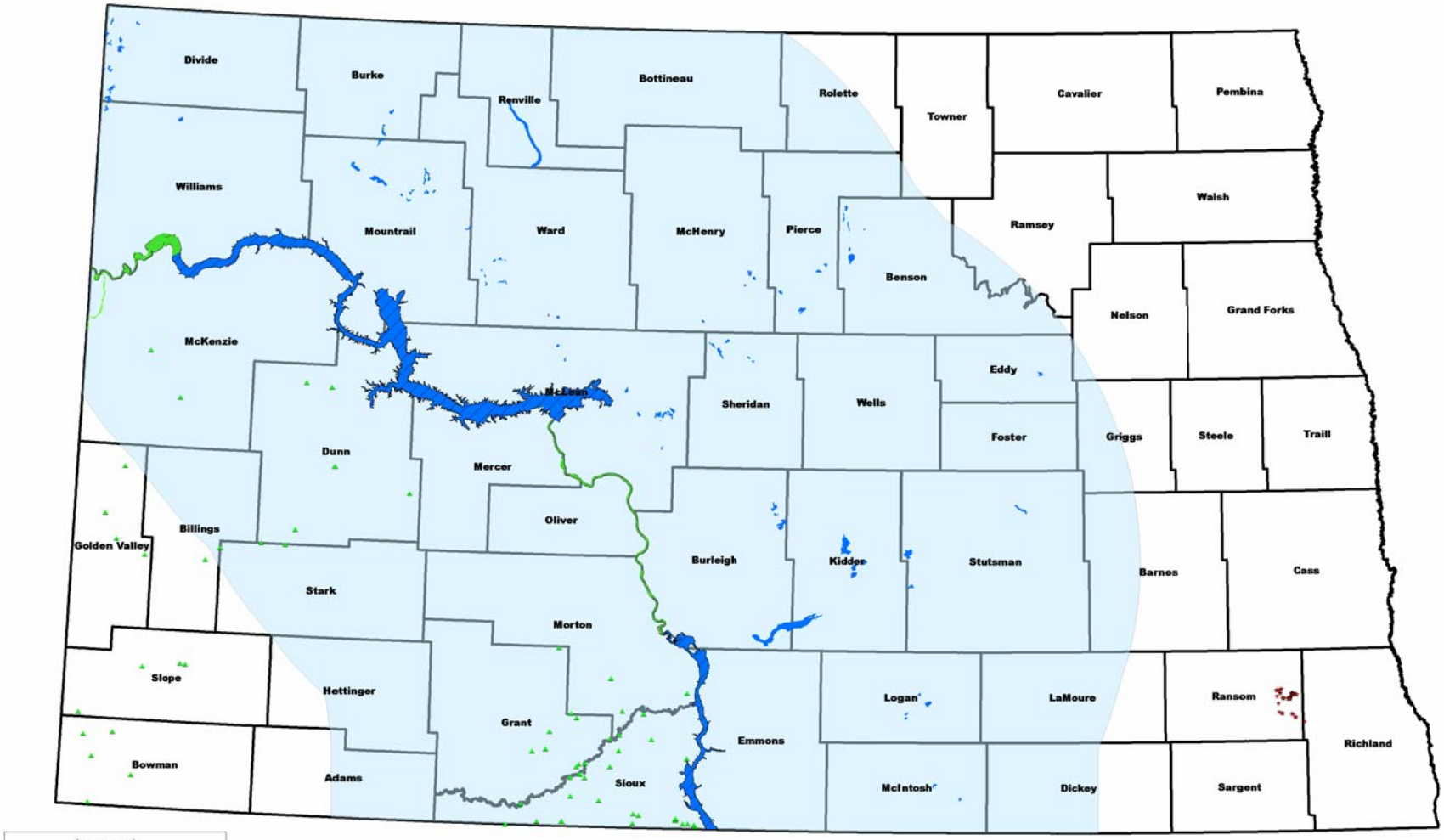

Figure 1. Endangered Species Habitat in North Dakota

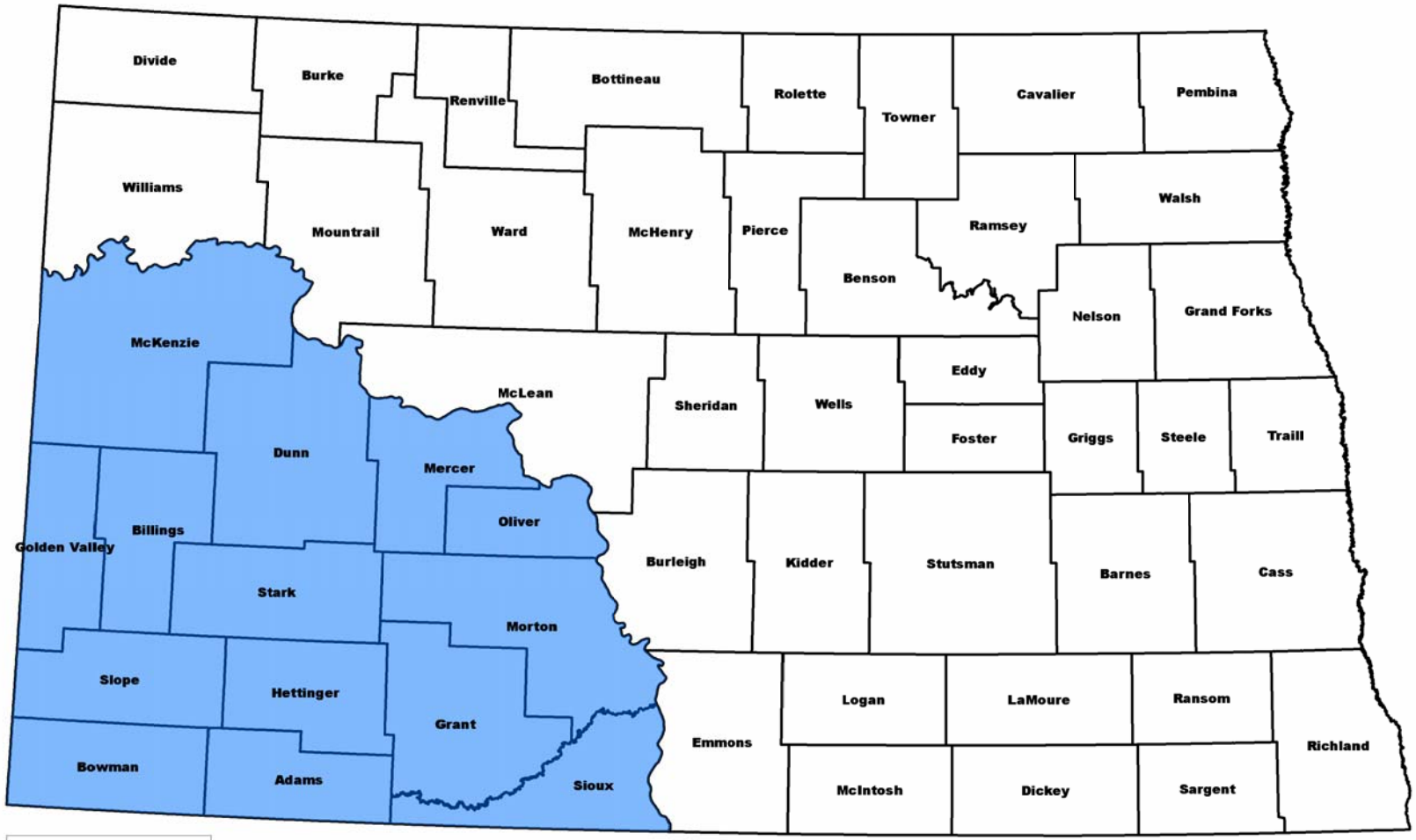

Figure 2. Potential Black Footed Ferret Habitat in North Dakota

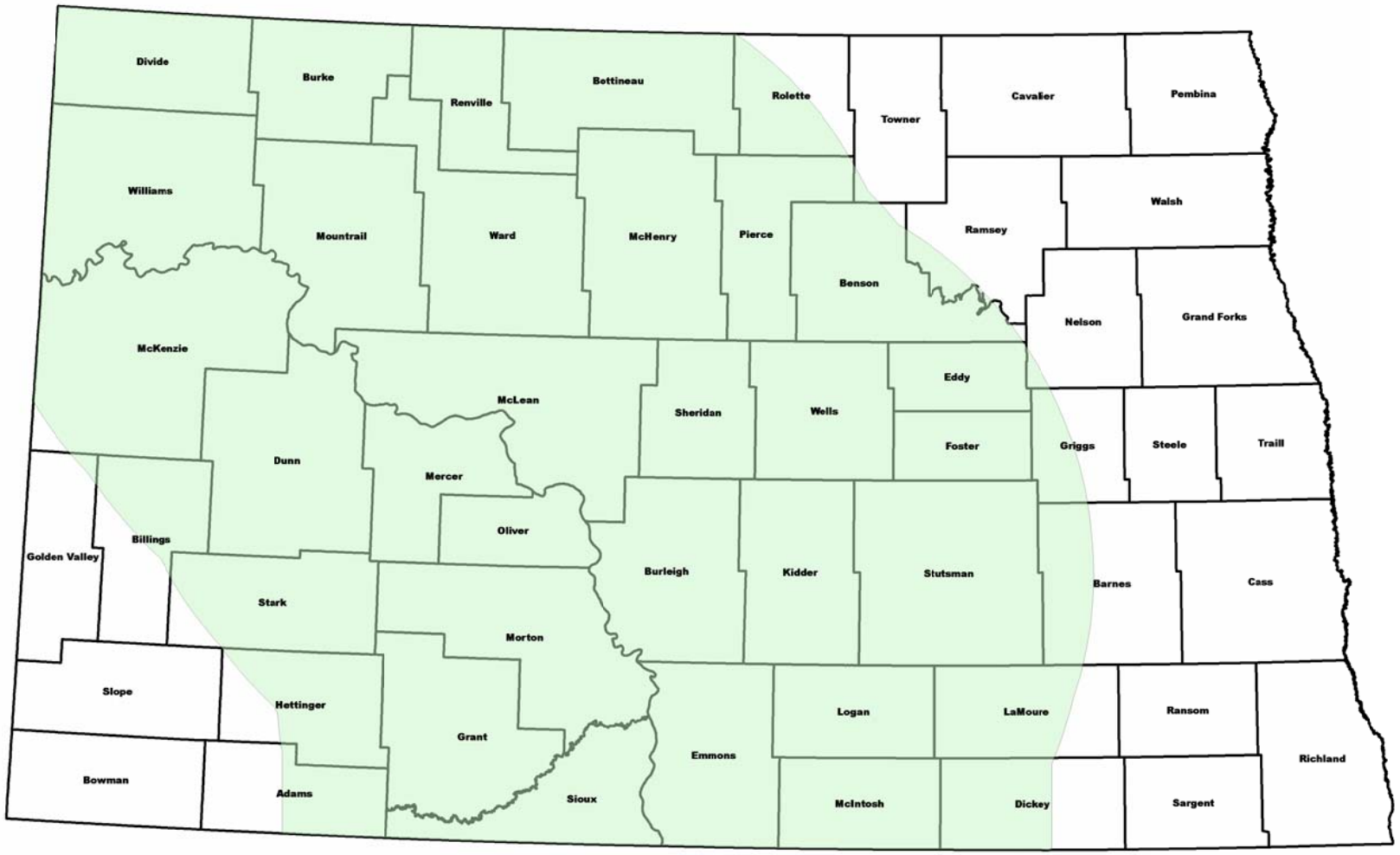

Figure 3. Whooping Crane Migration Corridor in North Dakota

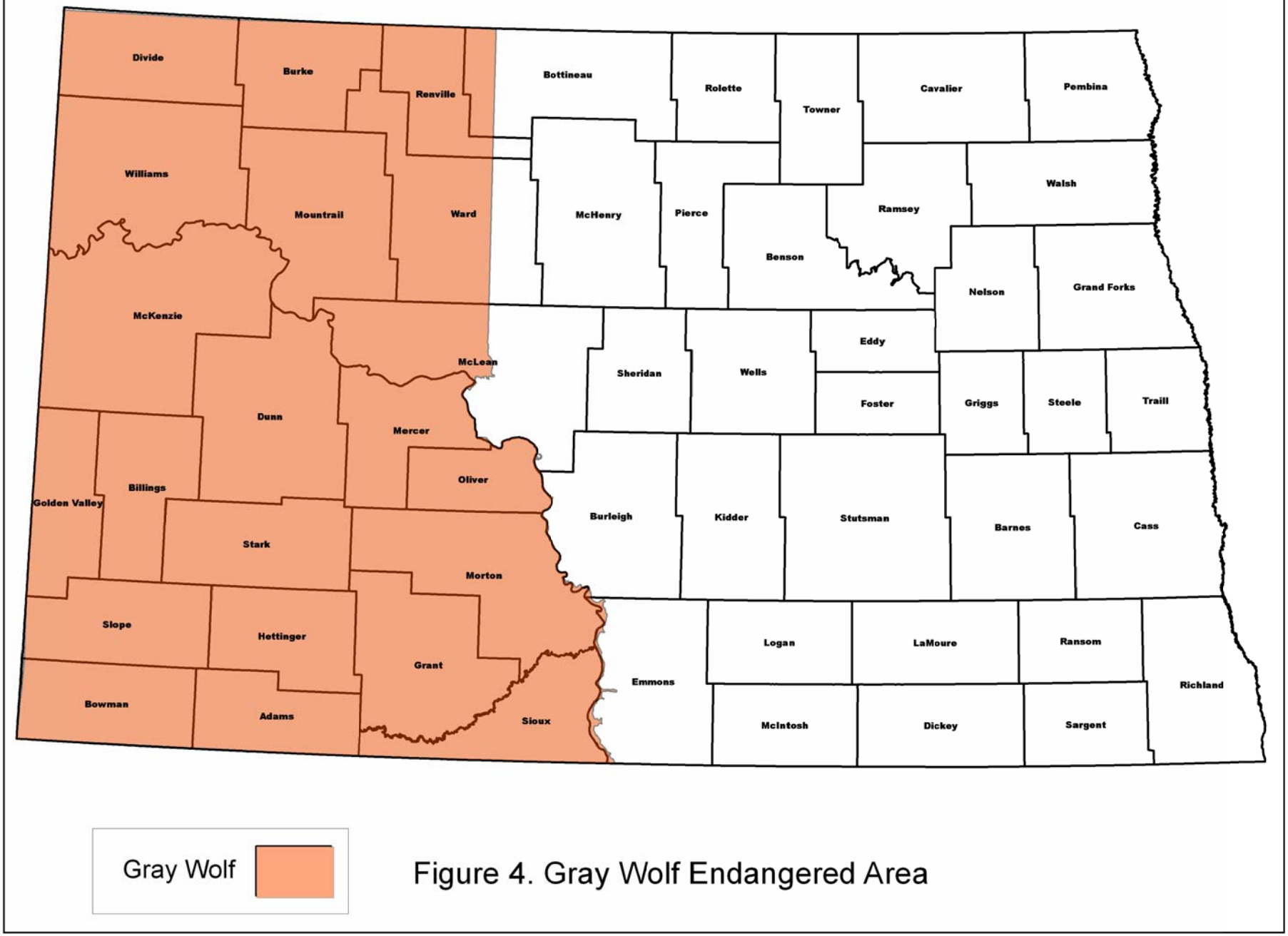

Figure 4. Gray Wolf Endangered Area

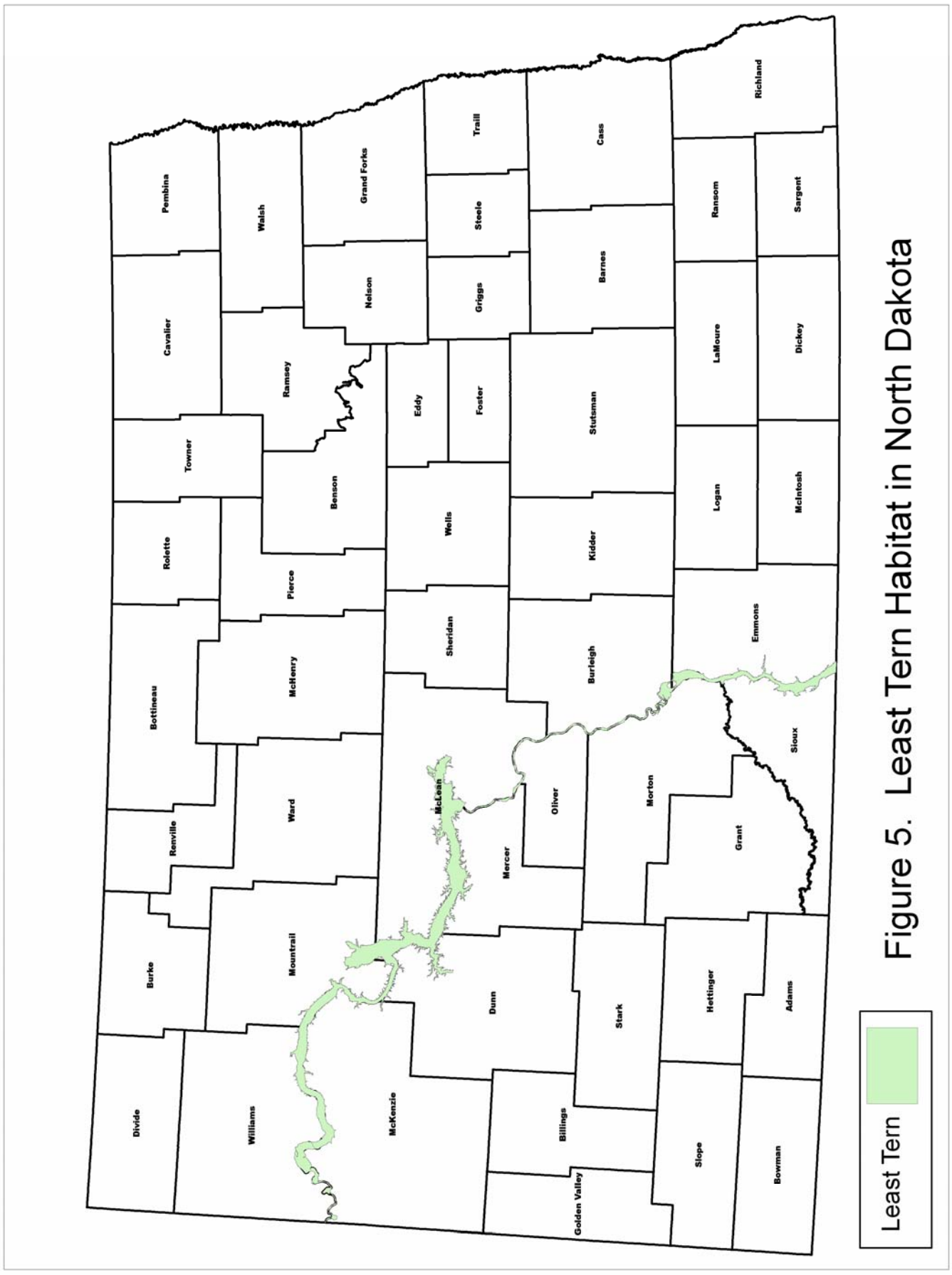

Figure 5. Least Tern Habitat in North Dakota

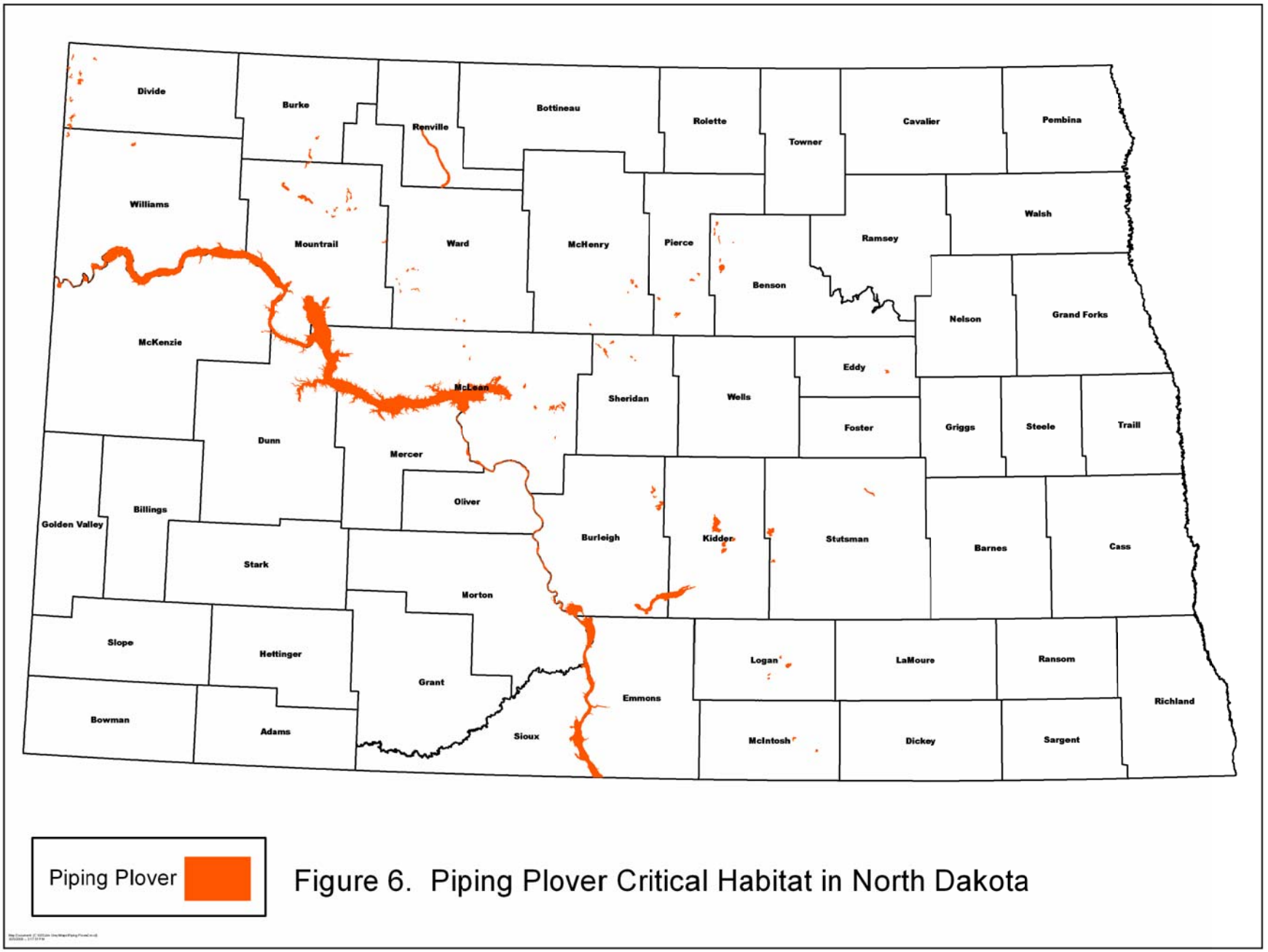

Figure 6. Piping Plover Critical Habitat in North Dakota

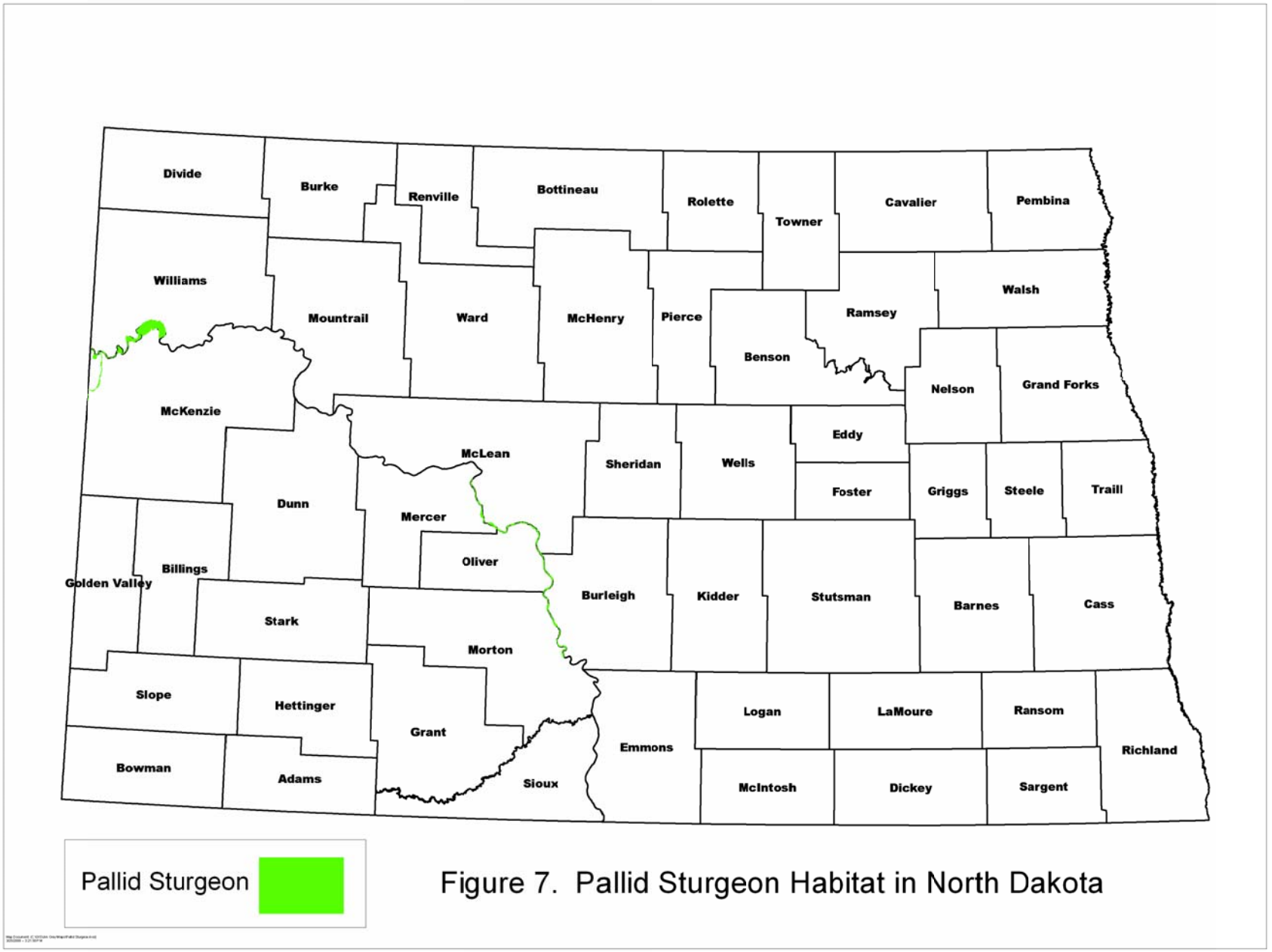

Figure 7. Pallid Sturgeon Habitat in North Dakota

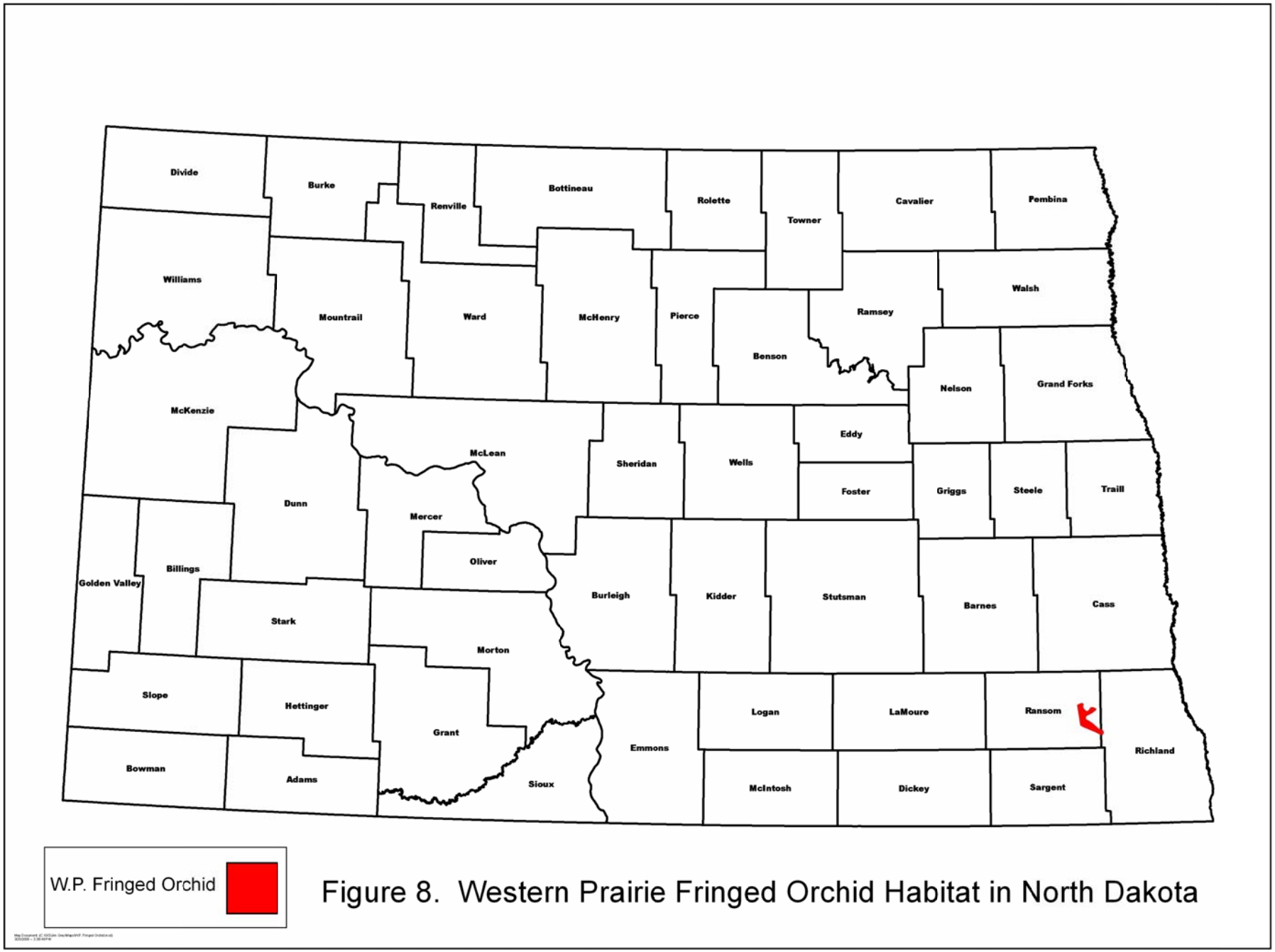

Figure 8. Western Prairie Fringed Orchid Habitat in North Dakota

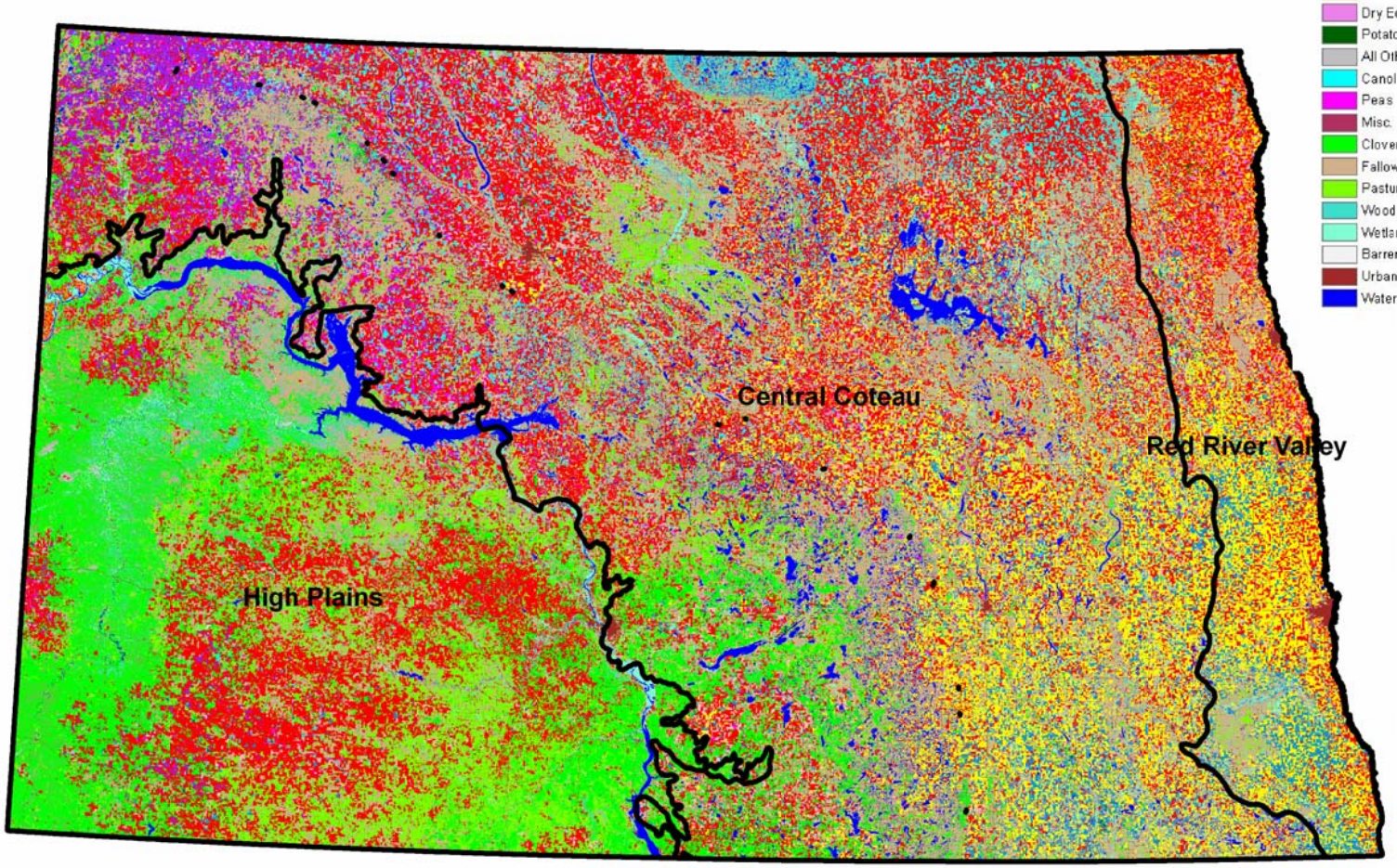

Figure 9. Ecoregions and crops grown in North Dakota

APPENDIX: Quality Control of Data

A. Pesticide Use Data

Pesticide use data is gathered every four years through collaboration among the North Dakota State University (NDSU), North Dakota Department of Agriculture (NDDA), and the North Dakota Field Office of the National Agriculture Statistics Service (NASS). Use data was last collected in 2004; although an updated survey will be conducted in early 2009.

In 2004 authors of the study included R.K. Zollinger, NDSU Extension Service; P. Glogoza, NDSU Extension Service; M.P. McMullen, NDSU Extension Service; C.A. Bradley, NDSU Extension Service; A.G. Dexter, NDSU/U of MN Extension Service; David Knopf, USDA, NASS, ND FO; Eric Wilson USDA, NASS, ND FO; Thomas DeJong, USDA, NASS, ND FO; and William Meyer, USDA, NASS, ID FO.

The specific objectives of the survey were to:

- identify acreage of crops treated with each pesticide group and identify specific pesticides used.
- determine pesticide usage by state districts.
- determine the percentage of pesticides applied by farm operator or custom applicator by air or ground equipment.
- determine extent of use of several non-chemical pest control methods.

Methodology
NDSU, NASS, and NDDA designed the survey. As in previous surveys, pesticide use data for wheat, barley, oat, corn, soybean, dry edible beans, dry pea, lentil, sunflower, safflower, flax, canola, mustard, sugarbeet, potato, alfalfa hay, other hay, CRP, fallow, and pasture were requested for the 2004 crop year. NASS was responsible for implementing the survey. The survey was conducted as a phone survey. NASS selected a sample population of 7,000 farm operators to represent each crop at the district level. The target for useable surveys was 3,500 responses, stratified across NASS's reporting districts. After selection of the sample population, a pre-survey letter was mailed to alert selected growers of the survey effort and content. Interviews were conducted from late February through March 2005.

The Questionnaire
The questionnaire was designed to collect pesticide data for major and minor crops, summer fallow, CRP and pasture in North Dakota for the 2004 crop year. The questionnaire was similar to those used previously. Information on individual crops, total acres seeded, acres seeded with any treated seed and acres seeded with farm-treated seed was obtained. Acres treated by crop were determined for the general pesticide categories of herbicides, insecticides, fungicides and desiccants.

Pesticide usage data included the active ingredient used, acres treated, number of applications, type of applicator (self-applied or applied via custom application), and method of application (ground or aerial) for each major crop or land use identified by the respondent.

The Sample
A sample of 7,000 farm operators was selected at random from the USDA National Agricultural Statistics Service (NASS) list of farm operators.

Data Collection and Editing
Telephone interviews were conducted from February to March 2005. A total of 3,232 usable surveys were obtained.

Of the producers surveyed for 2004, 40% grew wheat, 19% soybean, 18% barley, 16% corn, 13% oat, 8% sunflower, 7% flax, 6.7% canola, 3.8% field pea, 3.7% dry bean, 1.7% sugarbeet,1% lentil, 0.5% safflower, 0.5% mustard, 0.3% potato, 0% crambe, 28% alfalfa, 23% other hay, 40% CRP, 39% pasture, and 14% fallow.

The data review process addressed completeness and reasonableness of data within each section of the questionnaire and across sections. For example, the acreage treated with herbicides reported in the first section of the questionnaire was compared to the total herbicide-treated acreage reported in Section III for each crop.

B. Distribution and biology on listed species

Gray Wolf
The USFWS receives incidental reports of gray wolves from landowners and the general public. USDA-Wildlife Services conducts field investigations for all reports from landowners indicating the potential loss of livestock. There is no attempt to follow-up on the sightings submitted by the public as they are traveling the back roads of North Dakota.

Whooping Cranes
Whooping Crane tracking is a coordinated effort between the USFWS Bismarck Field Office and the North Dakota Game and Fish Department. Each fall and spring during migration, a press release is issued calling on the public to report sightings. Whenever possible, reports by the public are verified by biologists. If it is not possible to verify the report, the agency conducts an interview in an attempt to determine the accuracy of the report.

Black-footed Ferret
USFWS has no information documenting the presence of a black-footed ferret in North Dakota during the past 30 years.

Piping Plovers and Least Terns- Missouri River Populations
The Missouri River populations of plovers and terns are mapped by the US Army Corps of Engineers through a data management system. The Missouri River Recovery Program Least Tern and Piping Plover Data Management System (TP DMS) was developed to provide a single, centralized system for entry, storage, and dissemination of piping plover and least tern survey data from the Missouri River Basin while maintaining data quality standards for survey data and providing real time information for decision making processes.

Database structure enables avoidance of redundant record keeping and provides for easy and timely backups of survey data. Built in validation routines and manual approval provide for rigorous data standards and ensure quality data are available for reports and data presentation which can be used by our partners and decision makers. More information about the TP DMS database can be found at https://rsgis.crrel.usace.army.mil/intro/dms.dmsintro.main

Piping Plover- Coteau Populations

During the 2008 field season, 13 seasonal technicians and a wildlife biologist worked to monitor breeding pairs on private, federal, and state lands in the 10,000 mi^2 Core Area. Support for this effort was provided by the U.S. Fish & Wildlife Service (USFWS), and The Nature Conservancy (TNC).

During the 2008 field season, from mid-May through late-July, 13 seasonal technicians and wildlife biologists searched potential plover beaches for breeding pairs and their nests, using standardized methods (Murphy et al. 1999). The basins were all selected in the 1980's based on known likely habitat over 10,000 square mile Core Area that included private, federal and state lands. All basins with past records of plover use were searched, unless permission for access was not secured, or, vegetation and/or water conditions were poor for breeding habitat. An official survey was conducted from June 1st through June 17th coincide with the traditional timing of the International Piping Plover Census.

After locating and protecting nests, technicians attempted to check each breeding pair at least once a week to monitor the fate of the nest or chicks. Nests were not checked if inclement weather could jeopardize eggs or chicks. Technicians recorded the status of pairs and their nests/chicks on site maps and later entered all information into a chronological database. Nest and pair locations were obtained by using a global positioning system (GPS) to facilitate future management and research initiatives.

Typically the June census is conducted from June 1–17 each year to correspond with the dates of the International Census, which began in 1991 and is conducted every 5 years. This year, due to poor weather in early June and a large number of wetlands to survey, with too few staff, the census window was 'stretched' and surveys were counted from late May to early July (Table 1). One hundred and forty eight wetlands were surveyed; 61.5 percent of those were occupied by Piping Plovers.

Pallid Sturgeon- Missouri and Yellowstone Rivers upstream from Lake Sakakwea
Pallid sturgeon are regularly sampled in this area. There is currently a multi-agency assessment being conducted that is targeting pallid sturgeon throughout the primary recovery areas in the Missouri River. In addition, there is an augmentation effort being conducted to stock juvenile pallid sturgeon in the upper areas of this reach to meet several objectives of the Pallid Sturgeon Recovery Plan (Dryer & Sandvol, 1993).

Pallid Sturgeon- Missouri River below Garrison Dam to the border of South Dakota
Although there are no regularly targeted sampling efforts for pallid sturgeon in this area, there are annually occurring angler reports of adults being caught by anglers. These are generally followed up on to verify the validity of the report and in some cases photo evidence is available to confirm the identity as a pallid sturgeon.

Western Prairie Fringed Orchid Inventory Survey Protocol
North Dakota Parks and Recreation Department surveys western prairie fringed orchids in North Dakota. Their protocol is below.

Pre-Field Analysis Methods
1. Review 2006-2007 field survey reports.
2. Within allotments or pastures to be surveyed, identify areas of orchid habitat (wetlands or swales) on field maps. Orchids may be concentrated within these areas or may be dispersed across a wider topographic gradient.
3. Review project site map and location maps.
4. Review orchid survey form.

Field Survey Method (Walking– Transects)
1. Begin orchid blooming checks July 1 with surveys starting in early July, dependent on blooming.
2. Identify areas of orchid habitat (wetlands or swales) on field maps. Orchids may be concentrated within these areas or may be dispersed across a wider topographic gradient.
3. Survey the project area by traversing, on foot, the area using regularly spaced transects routes. Parallel transects of varying widths should be used. Transects width may vary depending on the topography and the amount of water present. (They should be approximately 30-50 meters apart, allowing a viewing distance of 15 meters on each side).
4. Transect boundaries should be flagged to prevent transect overlap and double counting.
5. Vegetative, abortive, and flowering orchids will be tallied and the numbers recorded by swale and by site. Budding orchid should be counted separately at the onset of the study, but will be tallied with the flowering orchids.
6. Within areas or orchid habitat, travel, on foot, 5 meters apart. Count each flowering or budding orchid observed and GPS points (see mapping guidelines below).

7. Areas of standing water should be traveled through, unless the water is too deep. In these cases, mark the position and continue travel 5 meters apart around the edge of the swale, until the entire swale edge is completed.
8. As orchids are observed, mark locations and boundaries on field maps, 7.5 minute topographic map or aerial photos, and flag population boundaries for GPS mapping.
9. Map all swale boundaries containing orchids on to 7.5-minute topographical map or aerial photos.

Mapping Guidelines:

- Small Populations (< 10 individuals) that are >20 feet apart
  Collect a GPS point at each plant
  Complete field form for each point collected or a combination of points

- Small Populations (< 10 individuals) that are <20 feet apart
  Collect a GPS point within the center of each sub-group.
  Complete field form for each point collected sub-group

- Populations (> 10 individuals)
  Collect a GPS point within the center of each sub-group.
  Complete field form for each Sub-group.

10. Record GPS location on the field form.
11. Map all areas surveyed on to 7.5-minute topographical map and aerial photos. Include estimated acreage covered for each sub-group.
12. Keep swales/wetlands separate from one another.
13. Multiple waypoints may be utilized within 1 swale as orchid populations are found-"Sub-populations".

Summary information is available for every orchid observation including dates of first observation, last observation, latitude, longitude and elevation, ownership of site, water shed, survey date, observer, effort ranked as low, medium or high and number of plants and flowering plants.

C. Information on the overlap between pesticide use and listed species

NDDA will provide maps using and combining the same quality data as the above sections.

D. Cropping information

Cropping information is from the National Agriculture Statistics Service (NASS), a division of the US Department of Agriculture. The data is from remote sensing based cropland acreage indications and verified with on the ground surveys.

The satellite used for remote sensing is AWiFS that is on the Resourcesat-1 satellite, run by the Indian Government. The satellite's resolution is 56 meters, or .77 acres; it covers the same area approximately every 5 days. NASS collects AWiFS data year round and may not need to supplement their program with MODIS. AWiFS has two cameras, each has with a swath width of 340 KM, combined it covers 740 KM, the bands are green, red, near-IR and sw-IR.

USDA/Farm Service Agency/Common Land Unit data is used for training our classifier in the agriculture domain and uses USGS/NLCD 2001 dataset to train over the non-agriculture domain. NASS uses a software combination of ArcGIS for ground truth editing, ERDAS Imagine and See5 for image processing, and SAS IML workshop for estimation.

NASS has two robust data sources to build the Cropland Data Layer (CDL). The AWiFS imagery continuously comes into our system as well as the CLU data so that they are making classifications with the most recent up to date datasets. The CDL is built annually and has been re-engineered within the last few years. Previously, Landsat imagery was used, June Ag Survey data for training data, and in-house software for image classification purposes. The latest CDL product for crop year 2008 will be available March 1.

The regression estimation uses not only data from the sensor but also data from the National June Agriculture Survey. The June Agriculture Survey data is used for building regression models and estimating acreage. During the survey 41,000 farms are contacted and 11,000 one square mile sample area segments are visited. The information provided by NASS is county and state level "major crops".

Metadata from the survey is downloadable at
http://www.nass.usda.gov/research/Cropland/metadata/meta.ht

E. Environmental monitoring data
Surface water monitoring data from the NDDA will have an EPA approved Quality Assurance Project Plan (QAPP).

F. Soil type information
Data on soil types in North Dakota come from the Natural Resource Conservation Service's National Cooperative Soil Survey. The Soil Survey Geographic Database (SSURGO) certification process was completed on June 9, 2005. Soil survey data have been archived digitally in every county across the state. The digital SSURGO dataset is being continuously maintained across the state with improved efficiency by incorporating use of Geographic Information Systems (GIS) into analysis.

Appendix Reference
Murphy, R. K., B. G. Root, P. M. Mayer, J. P. Goossen, and K. A. Smith. 1999. A draft protocol for assessing Piping Plover reproductive success on Great Plains alkali

lakes. Proceedings, Piping Plovers and Least Terns of the Great Plains and nearby. South Dakota State University, Brookings.